ECLS-Inorganics

Acidity

Synonyms:
Useful For: Measuring the acidity of an aqueous sample
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 50mL (250mL recommended)
Container: Plastic or glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper container or storage, sample exceeds 14 day holding time, improper labeling
Interpretation: Acids contribute to the corrosiveness of water and influence the chemical reaction rates, chemical specification and biological processes. The measurement can reflect a change in the quality of the water.
Method: SM2310 B. Titrimetric. An aliquot of the sample is titrated with a sodium hydroxide solution to a pH of 8.2.
Detection Limits: 1.0 mg/L
Cautions or Limitations: Excessive suspended matter or precipitates formed during the titration may cause inaccurate results.
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992
Charge: $9

ECLS-Inorganics

Alkalinity

Synonyms:
Useful For: Determining treatment of natural and wastewaters
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL (500mL recommended)
Container: Plastic or glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper container or storage, sample exceeds 14 day holding time, improper labeling
Interpretation:
Method: SM2320 B Titrimetric. An aliquot of the sample is titrated with a standard acid solution to a pH of 4.5.
Detection Limits: 1.0 mg/L
Cautions or Limitations: Soaps, oils, suspended solids or precipitates may coat the glass electrode and cause inaccurate results.
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992
Charge: $9

ECLS-Inorganics

Anionic Surfactants as MBAS

Synonyms: Methylene Blue Active Substances; ABS/LAS; MBAS; Surfactants
Useful For: Measures methylene blue active substances (MBAS) in aqueous mediums, not applicable for saline waters.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 125mL (500mL recommended)
Container: Plastic or glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper storage, sample exceeds 48 hour holding time.
Method: SM5540 A,C Anionic Surfactants as MBAS (Colorimetric). Methylene blue, a cationic dye, complexes with anionic substances in an aliqout of the sample and is then extracted into an organic solvent. The intensity of the color is then read on a spectrometer at 652nm and compared to a set of standards.
Detection Limits/Range: 0.1ppm to 2.5ppm (can be extended by dilution)
Cautions or Limitations: Possible interferences include sulfides, organic sulfonates, sulfates, carboxylates, phenols, inorganic cyanides, nitrates, chlorides, cationic surfactants such as amines, and particulate matter.
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989.
Charge: $27

ECLS-Inorganics

Asbestos/Fiberglass Air Sample Analysis

Synonyms: Air sample analysis by Phase Contract Microscopy (PCM)
Useful For: Estimates asbestos concentrations and indexes between asbestos and other fibers present.
Request Form: CHEM-15
Specimen/Sample Type: Air passed through a mixed cellulose ester (MCE)
Volume/Amount Required:
Container: Prescribed air cassette
Collection/Preservation: Cassette remains upright and air tight with a solid seal.
Storage Instructions: As in Collection/Preservation
Causes for Rejection: Improper paperwork; wrong type of filter used; cassette opens or is improperly stored.
Method: AL Method #400 - New Jersey Department of Health
Detection Limits: 0.25um - range of 100-1300 fibers/mm^2 of filter area
Cautions or Limitations: Other airborne fibers and high levels of non-fibrous dust particles.
Reference: NIOSH 7400 revised for evaluating airborne asbestos fibers, NIOSH Manual of Analytical Methods, 2nd Ed., Vol1, P&CAM 239.
Charge: $

ECLS-Inorganics

Asbestos Air Sample Analysis by TEM

Synonyms: Air sample analysis by Transmission Electron Microscopy (TEM)
Useful For: Determining the presence of airborne asbestos fibers in a building before and after abatement.
Request Form: CHEM-15
Specimen/Sample Type: Air passed through a mixed cellulose ester (MCE) or polycarbonate (PC) filter.
Volume/Amount Required: Minimum of 500L of air
Container: Prescribed air cassette
Collection/Preservation: Cassette remains upright and air tight with a solid seal.
Storage Instructions: As in Collection/Preservation
Causes for Rejection: Improper paperwork; wrong type of filter used; cassette opens or is improperly stored.
Method: AL Method #301 - New Jersey Department of Health

Detection Limits: 0.005 fibers/cc of air
Cautions or Limitations: Other airborne fibers and high levels of non-fibrous dust particles; mineral asbestos or asbestos-like minerals may interfere.
Reference: Asbestos Hazard Emergency Response Act of 1987, 40CFR Part 763; NVLAP - National Voluntary Laboratory Accreditation Program.
Charge: $214

ECLS-Inorganics

Asbestos Bulk Sample Analysis

Synonyms:
Useful For: Positive identification of suspected asbestos fibers in the solid phase.
Request Form: CHEM-15
Specimen/Sample Type: Solid/bulk material
Volume/Amount Required: 2 to 5 gm
Container: Glass jar or plastic bag (air tight)
Collection/Preservation:
Storage Instructions:
Causes for Rejection: Improper paperwork
Interpretation: Positive identification of suspect asbestos fibers is made by polarized light microscopy (PLM) and X-ray diffraction.
Method: AL Method #500 - New Jersey Department of Health
Detection Limits: 0.1%
Cautions or Limitations: For PLM, cellulose, glass and synthetic fibers interfere; for X-ray diffraction, mineral forms of asbestos and other minerals interfere.
Reference: Federal Register, July 7, 1986, 40CFR763, Subpart F, Appendix A.
Charge: $64

ECLS-Inorganics

Asbestos - Bulk

Synonyms: Floor tiles by PCM/PLM
Useful For: Analysis of asbestos containing floor tile material such as asphalt or vinyl floor material.
Request Form: CHEM-15
Specimen/Sample Type: Bulk
Volume/Amount Required: 1 square inch of floor tile or 4 to 5 grams of material
Container: Jar or plastic bag (air tight)
Collection/Preservation: None
Storage Instructions: None
Causes for Rejection: Improper paper work on submitting sample
Interpretation: Method for determination is PCM/PLM with confirmation by TEM.
Method: AL Method 700 - New Jersey State Department of Health.
Detection Limits/Range: 0.1%
Cautions or Limitations: Vinyl matrix may interfere
Reference: Federal Register, July 7, 1986, 40CFR763 Subpart F, Appendix A.
Charge: $64

ECLS-Inorganics

Asbestos Surface Sample Analysis

Synonyms: Wipe Analysis by Polarized Light Microscopy (PLM)
Useful For: Determination of the presence of trace amounts of asbestos or fiber glass in surface wipe samples.
Request Form: CHEM-15
Specimen/Sample Type: Dampened sheet of low ash #41 filter paper
Volume/Amount Required: 100 cm^2
Container: Air tight glass jar (2 or 4 oz)
Collection/Preservation: None
Storage Instructions: Place filter paper in glass jar and seal.
Causes for Rejection: Improper paperwork; wrong type of filter paper used
Interpretation:
Method: AL Method #600 - New Jersey Department of Health
Detection Limits:
Cautions or Limitations:
Reference: "Determination of Asbestos in Bulk Insulation," 40CFR Parts 763, Subpart F, Appendix A.
Charge: $64

ECLS-Inorganics

Asbestos Fibers in Water

Synonyms:
Useful For: Qualitative and quantitative analysis for asbestos fibers in drinking water supplies. The method allows for the quantitation of asbestos fibers.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 800mL to 1000mL in two containers
Container: Polyethylene or glass container - asbestos free
Collection/Preservation: None
Storage Instructions: 4^oC
Causes for Rejection: Improper sample bottles (not asbestos free), improper chain of custody request or sampling data.
Interpretation: Asbestos fibers are classified using selected area electron diffraction (SAED) and energy dispersive X-ray (EDAX) analysis .
Method: EPA Method 100.2
Detection Limits: Analytical sensitivity of 200,000 fibers per liter (0.2MFL)
Cautions or Limitations: Interferences are minerals that can exhibit morphological, chemical or crystal structures similar to the asbestos minerals.
Reference: "Analytical Methods for Determination of Asbestos Fibers in Water," 40CFR Parts 141, 142, and 143, Jan. 30, 1991.
Charge: $214

ECLS-Organics

Base Neutral and Acid Extractables in Soil

Synonyms: Semivolatile organics in soil, sediment, animal tissue; EPA 625
Useful For: Determination of a wide range of some 60 organic compounds of various types such as chlorinated benzenes, chlorinated phenols, haloethers, nitrophenols, phthalate esters, and polynuclear aromatic hydrocarbons that can be partitioned into an organic solvent and are amenable to gas chromatography.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Soil, sediments, animal tissue
Volume/Amount Required: 8 ounces

Container: 8 oz widemounth glass jar with Teflon lined screw cap
Collection/Preservation: Chill to 4°C
Storage Instructions: Store at 4°C
Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount.
Interpretation:
Method: SW846, Methods 3540 Extraction and 3640 Cleanup; EPA 625. A 10g solid sample is mixed with anhydrous sodium sulfate, placed in an extraction thimble and extracted using methylene chloride in a Soxhlet extractor. Water is removed from the extract. The extract is then concentrated and cleaned using gel permeation chromatography. The extract is further concentrated to a volume of 1mL and analyzed by GC/MS. The compounds are identified by comparison of retention times and mass spectra with those obtained from standards run under identical conditions. The concentration is determined by relating the response of the analyte to an internal standard.
Detection Limits/Range: Detection limits range from 100ug/kg to 300ug/kg. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: Utilization of both retention times and mass spectra provides an extremely high degree of confidence in compound identification.
Reference: Federal Register, Part VII, 40CFR136, App. A, July 1, 1993, Method 625; EPA SW846 Methods 3540 (Rev.1), 3640 (Rev.0), 1987.
Charge: $364

ECLS-Organics
Base Neutral and Acid Extractables in Water
Synonyms: Semivolatile organics, EPA Method 625
Useful For: Determination in municiple and industrial discharge of 60 organic compounds of various types such as chlorinated benzenes, chlorinated phenols, haloethers, nitrophenols, phthalate esters, polynuclear aromatic hydrocarbons and others that can be partitioned into an organic solvent and are amenable to gas chromatography.
Request Form: HEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 3 x 1000mL
Container: 1000mL amber glass bottle with Teflon lined screw cap
Collection/Preservation: Do not rinse bottle with sample prior to filling. If residual chlorine is present, add 80mg sodium thiosulfate per liter of sample and mix well. Chill to 4°C.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount.
Interpretation:
Method: EPA Method 625. A 1 liter sample is serially extracted with methylene chloride at a pH greater than 11. The procedure is then repeated at a pH less than 2. Water is removed from the extracts and they are concentrated to a volume of 1mL and analyzed by GC/MS. The compounds are identified by comparison of retention times and mass spectra with those obtained from standards run under identical conditions. The concentration is determined by relating the response of the analyte to an internal standard.
Detection Limits/Range: Detection limits range from 1.0ug/L to 3.0ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: Utilization of both retention times and mass spectra provide an extremely high degree of confidence in compound identification.
Reference: Federal Register, Part VII, 40CFR136, App. A, July 1, 1993.
Charge: $331

ECLS-Inorganics
Biochemical Oxygen Demand 5-Day
Synonyms: BOD_5
Useful For: Determining the relative oxygen requirements of municipal and industrial wastewaters. Data is used for the development of engineering criteria for the design of wastewater treatment plants.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 1000mL
Container: Glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper container, paperwork, storage, labeling; exceeding the 48 hour holding time
Method: SM5210 B. Electrochemical measurement of oxygen depletion after incubation without light for 5 days.
Detection Limits: Varies with amount of oxygen demand present in the sample.
Cautions or Limitations:
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992
Charge: $30

ECLS-Inorganics
Demand 20-Day
Synonyms: BOD_{20}
Useful For: Determining the relative oxygen requirements of municipal and industrial wastewaters. Data is used for the development of engineering criteria for the design of wastewater treatment plants and to evaluate the effectiveness of treatment process.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 1000mL
Container: Glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper container, paperwork, storage, labeling; exceeding the 48 hour holding time
Method: SM5210 B. Electrochemical measurement of oxygen depletion after incubation without light for 20 days.
Detection Limits: Varies with amount of oxygen demand present in sample.
Cautions or Limitations:
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992
Charge: $30

ECLS-Inorganics
Carbonaceous Biochemical Oxygen Demand 5-Day
Synonyms: $CBOD_5$

Useful For: Determining the relative oxygen requirements of municipal and industrial wastewaters. Data is used for the development of engineering criteria for the design of wastewater treatment plants.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 1000mL
Container: Glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper container, paperwork, storage, labeling; exceeding the 48 hour holding time
Method: SM5210 B. Electrochemical measurement of oxygen depletion after incubation without light for 5 days after adding 0.3gm of 2-chloro-6-(trichloromethyl) pyridine to inhibit nitrogeneous oxygen demand.
Detection Limits: Varies with amount of oxygen demand present in the sample.
Cautions or Limitations:
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992
Charge: $30

ECLS-Inorganics

Carbonaceous Biochemical Oxygen Demand 20-Day

Synonyms: $CBOD_{20}$
Useful For: Determining the relative oxygen requirements of municipal and industrial wastewaters. Data is used for the development for engineering criteria for the design of wastewater treatment plants.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 1000mL
Container: Glass bottles
Collection/Preservation: None
Storage Instructions: 4°C
Causes for Rejection: Improper container, paperwork, storage, labeling; exceeding the 48 hour holding time
Method: SM5210 B. Electrochemical measurement of oxygen depletion after incubation without light for 20 days after adding 0.3gm of 2-chloro-6-(trichloromethyl) pyridine to inhibit nitrogenous oxygen demand.
Detection Limits: Varies with amount of oxygen demand present in the sample.
Cautions or Limitations:
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992
Charge: $30

ECLS-Inorganics

Chemical Oxygen Demand - Low Level

Synonyms: COD-Low
Useful For: Determining the quantity of oxygen required for oxidation of reduced species, including organic matter, in a water sample.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 10mL (100mL recommended)
Container: Plastic or glass bottles (preferably glass)
Collection/Preservation: Preserve sample with conc. H_2SO_4 to a pH of 2.
Storage Instructions: Store at 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM5220D Closed Reflux Colorimetric Method, Low COD Value Twist Tube Method. An aliquot is measured in an low level COD reagent ampule which is then sealed and digested. After cooling, the ampule is placed into a spectrometer and read at 420nm and the reading compared to a set of standards.
Detection Limits/Range: 5ppm to 150ppm
Cautions or Limitations: Halides (chlorides), reduced inorganic species such as ferrous iron, sulfide, manganous manganese, and volatile straight-chain aliphatic compounds interfere.
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989.
Charge: $16

ECLS-Inorganics

Chemical Oxygen Demand - Standard Level

Synonyms: COD-Standard
Useful For: Determining the quantity of oxygen required for oxidation of reduced species, including organic matter, in a water sample.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 10mL (100mL recommended)
Container: Plastic or glass bottles (preferably glass)
Collection/Preservation: Preserve sample with conc. H_2SO_4 to a pH of 2.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM5220D Closed Reflux Colorimetric Method. An aliquot of the sample is measured into an ampule. The ampule is then sealed and digested, cooled and read at 600nm in a spectrometer and the reading compared to a set of standards.
Detection Limits/Range: 20ppm to 900ppm
Cautions or Limitations: Halides (chlorides), reduced inorganic species such as ferrous iron, sulfide, manganous manganese, and volatile straight-chain aliphatic compounds interfere.
Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989
Charge: $16

ECLS-Inorganics

Chloride

Synonyms: Cl^-
Useful For: Determining the chloride content of drinking water, surface water and ground water.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL (250mL recommended)
Container: Glass or plastic bottles
Collection/Preservation: Cool to 4°C
Storage Instructions: 4°C
Causes for Rejection: Improper storage, sample exceeds 28 day holding time.
Method: SM4500 Cl^- B Argentometric Method. Potassium chromate is used to indicate the endpoint of a silver nitrate titration of chloride.

Detection Limits/Range: 0.5mg/L
Cautions or Limitations: Sulfide, thiosulfate, and sulfite ions interfere but can be removed by treatment with hydrogen peroxide. Orthophosphate in excess of 25mg/L interferes by precipitation as silver phosphate. Iron in excess of 10mg/L interferes by masking the endpoint.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed., 1989
Charge: $13

ECLS-Inorganics

Color

Synonyms:
Useful For: Determining the color of potable water and other waters in which color is due to naturally occurring materials
Request Form: CHEM-44, DWR-018 (PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL
Container: Glass or plastic bottles
Collection/Preservation: Cool to 4°C
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 48 hour holding time.
Method: SM2120 B Visual Comparison Method. Visual comparison with standards which produce 1 unit of color from 1mg/L of platinum as chlororplatinate ion.
Detection Limits/Range: 5 Platinum-Cobalt Units
Cautions or Limitations: Turbidity interferes but can be removed by filtration. Changes in pH may affect the color of the sample.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed., 1989
Charge: $12

ECLS-Inorganics

Cyanide (Total), Aqueous

Synonyms: CN^-
Useful For: Determination of cyanide in water
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 500mL (1000mL recommended)
Container: Plastic or glass bottles
Collection/Preservation: Preserve sample with 10N NaOH to a pH of 12 and, if residual chlorine is present, add 0.6g Ascorbic Acid prior to preservation.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper preservation or storage, sample exceeds 14 day holding time.
Method: SM4500 CN A, B Preliminary Treatment of Sample, C Total Cyanide after Distillation, E Colorimetric Method. After the sample is treated and the cyanide distilled, Chloramine-T is added to form CNCl. The CNCl reacts with a colorizing agent to form a red-blue color which is read on a spectrometer at 578nm.
Detection Limits/Range: 0.01ppm to 3.0ppm (can be extended by dilution)
Cautions or Limitations: Interferences are eliminated or greatly reduced during the distillation step.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989.
Charge: $27

ECLS-Inorganics

Cyanide, (Total), Non-aqueous

Synonyms: CN^-
Useful For: Determination of cyanide in solids.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Non-aqueous
Volume/Amount Required: 10g (100g recommended)
Container: Plastic or glass bottles
Collection/Preservation: Chill to 4°C.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper storage, sample exceeds 14 day holding time.
Method: SM4500 CN A, B Preliminary Treatment of Samples, C Total Cynainde after Distillation, E Colorimetric Method. After the sample is treated and the cyanide distilled, Chloramine-T is added to form CNCl. The CNCl reacts with a colorizing agent to from a red-blue color which is read on a specrometer between 575 and 582nm.
Detection Limits/Range: 0.5ppm to 150ppm (can be extended by dilution)
Cautions or Limitations: Interferences are eliminated or greatly reduced during the distillation step.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989.
Charge: $30

ECLS-Organics

Disinfectant Byproducts

Synonyms: EPA Method 551
Useful For: Determination of chlorination by-products in drinking, ground, raw water and water at any intermediate chlorination treatment stage.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 4 x 40mL
Container: 40mL amber glass vial with Teflon lined screw cap
Collection/Preservation: Add 4mg of ammonium chloride and adjust pH to 4.5 to 5.0 with HCl. Fill vials leaving no air bubbles. Chill to 4°C.
Storage Instructions: Store at 4°C away from light.
Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount, air bubbles in vial.
Interpretation:
Method: EPA Method 551. A 35mL aliquot of sample is extracted with methyl-tert-butyl ether (MTBE). 1*u*L of the extract is then injected into a GC equipped with a fused silica capillary column and electron capture detector.
Detection Limits/Range: Detection limits range from 0.05ug/L to 100ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: Utilization of dual dis-similar columns provides excellent reliability in identification of analytes. However, the potential for incorrect identification can not be totally ruled out. Quantitation is accurate within +/-20%.
Reference: EPA Method 551, Methods for the Determination of Organic Compounds in Drinking Water, Supplement I, USEPA, July 1990.
Charge: $421

ECLS-Inorganics

Dissolved Oxygen

Synonyms: DO

Useful For: Key test in water pollution and waste treatment process control.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 300mL

Container: Glass bottles

Collection/Preservation: 2mL manganous sulfate solution followed by 2mL alkaline iodide-azide solution well below surface.

Storage Instructions: 4°C

Causes for Rejection: Improper preservation, paperwork, storage, improper labeling.

Method: SM4500 O. Electrochemical Measurement

Detection Limits: 0.2 mg/L

Cautions or Limitations: Interferences include oxidizing and reducing agents, nitrate ion, ferrous ion, and organic matter.

Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992

Charge: $17

ECLS-Inorganics

Fluoride (Drinking Water)

Synonyms: F^-

Useful For: Suitable for drinking water for fluoride range of 0.1 mg/L to 1000mg/L.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous (potable)

Volume/Amount Required: 300 mL

Container: Glass or plastic bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.

Method: EPA 340.2, SM4500 F^- C Ion Selective Electrode Method. The level of fluoride is then read using an electrode.

Detection Limits/Range: 0.1mg/L, 0.1 mg/L to 1000mg/L

Cautions or Limitations: The addition of a pH 5.0 buffer containing a strong chelating agent eliminates most of the interferences from silicon, iron and aluminum.

Reference: *Standard Methods for the Examination of Water and Wastewater*, 18th Ed., 1992, 17th Ed., 1989; EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes*, March 1979.

Charge: $22

ECLS-Inorganics

Fluoride (Non-potable water)

Synonyms: F^-

Useful For: Determining the fluoride present in stream, surface and wastewater.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous (non-potable)

Volume/Amount Required: 500mL

Container: Glass or plastic bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.

Method: EPA 340.2, SM4500 F^- B (Preliminary Distillation Step) and C Ion Selective Electrode Method. Distillation is employed to separate the fluoride from most interferences and the level of fluoride is then read using an ion selective electrode.

Detection Limits/Range: 0.1mg/L, 0.1 mg/L to 1000mg/L

Cautions or Limitations: The addition of a pH 5.0 buffer containing a strong chelating agent eliminates most of the interferences from silicon, iron and aluminum.

Reference: *Standard Methods for the Examination of Water and Wastewater*, 18th Ed., 1992,17th Ed., 1989; EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes*, March 1979.

Charge: $44

ECLS-Inorganics

Furnace Metals, Aqueous

Synonyms: As, Sb, Pb, Se, Tl

Useful For: Determination of dissolved and total metals in drinking, surface and saline water and industrial and domestic wastewater.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 250mL (1000mL recommended)

Container: Plastic or glass bottles

Collection/Preservation: Adjust pH to less than 2 with HNO_3

Storage Instructions: Ambient temperature

Causes for Rejection: Improper preservation or storage, sample exceeds 6 month holding time, improper labeling.

Method: EPA 200.9, Revision 2.2. An aliquot of the sample is digested in an acid solution and the resulting digestate is analyzed using graphite furnace atomic absorption.

Detection Limits: 1.0ppb for As and Pb, 2.0ppb for Sb, Se, Tl

Cautions or Limitations: Interference is possible for samples with high salt or solids content, highly viscous samples or samples with a high iron content.

Reference: EPA 600/R-94/111, Environmental Monitoring Systems Laboratory, Office of Research and Development, United States Environmental Protection Agency, Cincinnati, Ohio.

Charge: $25/element

ECLS-Inorganics

Furnace Metals by AAS, Non-aqueous

Synonyms: As, Sb, Pb, Se, Tl

Useful For: Determination of dissolved and total metals in non-aqueous samples after suitable preparation.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Non-aqueous

Volume/Amount Required: 250mL (1000mL recommended)

Container: Acid washed screw-capped; or ziplock plastic bag

Collection/Preservation: None

Storage Instructions: Ambient temperature

Causes for Rejection: Improper preservation or storage, sample exceeds 6 month holding time, improper labeling.

Method: EPA 200.9, Revision 2.2. An aliquot of the sample is digested in an acid solution and the resulting digestate is analyzed using graphite furnace atomic absorption spectrometry.

Detection Limits: Varies with sample type and element. Contact the laboratory for a information about detection limits.

Cautions or Limitations: Matrix interferences may occur.

Reference: EPA 600/R-94/111, Environmental Monitoring Systems Laboratory, Office of Research and Development, United States Environmental Protection Agency, Cincinnati, Ohio.
Charge: $39/element

ECLS-Organics
Haloacetic Acids
Synonyms: EPA Method 552.1
Useful For: Determination of haloacetic acids and dalapon in drinking, ground, raw water and water at any intermediate chlorination treatment stage.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 2 x 250mL
Container: 250mL amber glass bottle with Teflon lined screw cap
Collection/Preservation: Add 25mg of ammonium chloride to each bottle. Fill bottles leaving no head space and mix well. Chill to 4°C.
Storage Instructions: Store at 4°C away from light.
Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount, excess head space in bottle.
Interpretation:
Method: EPA Method 552.1. The sample pH is adjusted to 5.0 and extracted with a mini anion exchange column. The analytes are eluted with small aliqouts of acidic methanol and esterified directly in this medium after the addition of a small amount of methyl-tert-butyl ether (MTBE) as a co-solvent. The methyl esters are partitioned into the MTBE phase and an aliquot of the extract is then injected into a GC equipped with a fused silica capillary column and electron capture detector.
Detection Limits/Range: Detection limits range from 0.5ug/L to 60ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: Utilization of dual dis-similar columns provides excellent reliability in identification of analytes. However, the potential for incorrect identification can not totally be ruled out. Quantitation is accurate within +/-30%.
Reference: EPA Method 552.1, Methods for the Determination of Organic Compounds in Drinking Water, Supplement II, USEPA, August 1992.
Charge: $378

ECLS-Inorganics
Hardness, Total
Synonyms: $CaCO_3$
Useful For: Suitable for all concentrations of hardness.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL
Container: Glass or plastic bottles
***Collection/Preservation*:** Acidify sample with conc HNO_3 to a pH of 2 or less and cool to 4°C.
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 6 month holding time.
Method: EPA 130.2, SM2340 C Hardness - EDAT Titrimetric Method. The level of hardness is determined by titration with disodium ethylenediaminetetraacetate (Na_2EDTA) with an endpoint detected by use of Eriochrome Black T Indicator (red to blue color change).
Detection Limits/Range: 2.0mg/L
Cautions or Limitations: Excessive amounts of other metals may interfere. The addition of cyanide to complex these metals reduces the interference.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992,17th Ed., 1989; EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes,* March 1979.
Charge: $22

ECLS-Inorganics
ICP Metals, Aqueous
Synonyms: Al, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Mg, Mn, Ni, K, Ag, Na, Zn
Useful For: Determination of dissolved and total metals in drinking, surface and saline water and industrial and domestic wastewater.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 1000mL
Container: Plastic or glass bottles
Collection/Preservation: Adjust pH to less than 2 with HNO_3
Storage Instructions: Ambient temperature
Causes for Rejection: Improper preservation or storage, sample exceeds 6 month holding time, improper labeling.
Method: EPA 200.7, Revision 4.4 Metals by ICP. An aliquot of the sample is digested and concentrated then analyzed using Inductively Coupled Argon Plasma Emission Spectroscopy (ICP). Each element has its own set of wavelengths used to identify the element and the response is compared to a set of standards run under the same conditions used for identification.
Detection Limits: 1.0ppb for most elements, 100ppb for minerals
Cautions or Limitations: Interference is possible for samples with high salt or solids content, highly viscous samples
Reference: EPA 600/R-94/111, Environmental Monitoring Systems Laboratory, Office of Research and Development, United States Environmental Protection Agency, Cincinnati, Ohio.
Charge: $20/element

ECLS-Inorganics
ICP Metals, Non-aqueous
Synonyms: As, Sb, Pb, Se, Tl
Useful For: Determination of dissolved and total metals in non-aqueous samples after suitable preparation.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Non-aqueous (including soil, sludge, food)
Volume/Amount Required: 20g (100g recommended)
Container: Acid washed glass jar or ziplock plastic bag
Collection/Preservation: None
Storage Instructions: Ambient temperature
Causes for Rejection: Sample exceeds 6 month holding time, improper labeling.

Method: EPA 200.7, Revision 4.4. Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry. An aliquot of the sample is digested in an acid solution using the

appropriate method and the resulting digestate is analyzed using inductively coupled argon plasma spectrometry.
Detection Limits: Varies with sample type and element. Contact the laboratory for a information about detection limits.
Cautions or Limitations: Matrix interferences may occur.
Reference: EPA 600/R-94/111, Environmental Monitoring Systems Laboratory, Office of Research and Development, United States Environmental Protection Agency, Cincinnati, Ohio.
Charge: $37/element

ECLS-Inorganics
Iodine
Synonyms: I_2
Useful For: Determination of iodine and/or hypoiodous acid in potable water, swimming pool water, ground water, and wastewater.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 75mL (250mL recommended)
Container: 250mL Amber glass bottles
Collection/Preservation: None
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper storage, sample exceeds 72 hour holding time.
Method: SM4500 I A,B Leuco Crystal Violet Method (Colorimetric). The iodine in the aliqout of sample is converted to hypoiodous acid with mercuric chloride. The hypoiodous acids reacts with 4,4',4"-methylidynetris (*N*,*N*-dimethylaniline) to form crystal violet dye. The intensity is read at 592nm and compared to a set of standards.
Detection Limits/Range: 0.05ppm to 3.0ppm (can be extended by dilution)
Cautions or Limitations: Interferences include chloride levels over 200mg/L, oxidized forms of manganese, iodide over 50mg/L.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989.
Charge: $25

ECLS-Inorganics
Mercury
Synonyms: Hg
Useful For: Determination of total mercury (organic and inorganic) in drinking, surface, ground, sea, and brackish waters and industrial and domestic wastewaters.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 250mL (1000mL recommended)
Container: Plastic or glass bottles
Collection/Preservation: Adjust pH to less than 2 with HNO_3
Storage Instructions: Ambient temperature
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time, improper labeling.
Method: EPA 245.1, Revision 3.0
Detection Limits/Range: 0.2ppb to 10ppb (can be extended by dilution)
Cautions or Limitations: Interferences have been reported in waters containing sulfide, chloride, copper and tellurium. Some organic compounds are confirmed interferences.
Reference: EPA 600/R-94/111, Environmental Monitoring Systems Laboratory, Office of Research and Development, United States Environmental Protection Agency, Cincinnati, Ohio.
Charge: $25

ECLS-Inorganics
Nitrogen, Ammonia
Synonyms:NH_3 -N, NH_3
Useful For: Determination of naturally occurring ammonia as well as that produced by biological degradation of organic nitrogen containing compounds and urea.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL (250mL recommended)
Container: Glass bottles
Collection/Preservation: Adjust pH to 2 with H_2SO_4 and cool to 4°C
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM4500-NH_3^+ H Automated Phenate Method. An aliquot of the sample is reacted with alkaline phenol and hypochlorite to form indophenol blue. The intensity of the color is proportional to the amount of ammonia in the aliquot.
Detection Limits/Range: 0.03ppm, 0.03ppm to 2.0ppm (can be extended by dilution)
Cautions or Limitations: Calcium and magnesium may interfere
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992.
Charge: $30

ECLS-Inorganics
Nitrogen, Kjeldahl
Synonyms: TKN, Total Kjeldahl Nitrogen
Useful For: Determination of organic nitrogen and ammonia present in the sample.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 50mL (250mL recommended)
Container: Glass or plastic bottles
Collection/Preservation: Cool to 4°C, Adjust to pH 2.0(+.3) with conc H_2SO_4
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM4500-N_{ORG} C Semi-Automated Block Digestion and Automated Salicylate Analysis. In the presence of H_2SO_4, potassium sulfate, and mercuric sulfate catalyst, amino nitrogen is converted to ammonium sulfate. Free ammonia and ammonium-nitrogen are also converted. A mercury ammonium complex is formed during digestion and then decomposed by sodium thiosulfate. The ammonia is determined using the automated salicylate analysis.
Detection Limits/Range: 0.03ppm, 0.03ppm to 2.0ppm (can be extended by dilution)
Cautions or Limitations: High nitrate levels, inorganic salts, solids and large amounts of organic matter may cause interferences.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, EPA Method 351.2.
Charge: $27

ECLS-Inorganics

Nitrogen, Nitrite

Synonyms: NO_2^- -N, NO_2^-

Useful For: Determination of nitrite, an intermediate oxidation state of nitrogen both in the oxidation of NH_3 and the reduction of NO_3.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 10mL (100mL recommended)

Container: Glass bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 48 hour holding time.

Interpretation: Nitrite is the etiologic agent of methemoglobinemia in infants and can react with amines to form carcinogenic nitrosamines.

Method: SM4500-NO_2^- B Colorimetric Method - Diazotized sulfanilamide reacts with *N*-(1-naphthyl)-ethylenediamine dihydrochloride (NED) to form a reddish purple azo dye at pH 2.0 to 2.5. The intensity of the color is read at 543nm and is proportional to the concentration of nitrite.

Detection Limits/Range: 0.003ppm, 0.003ppm to 0.200ppm (can be extended by dilution).

Cautions or Limitations: Cupric ions and suspended solids may cause interferences.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992.

Charge: $24

ECLS-Inorganics

Nitrite & Nitrate

Synonyms: NO_3^- & NO_2^-, NO_3^- & NO_2^- -N

Useful For: Determination of nitrate and nitrite

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 10mL (250mL recommended)

Container: Glass bottles

Collection/Preservation: Adjust pH to 2 with H_2SO_4 and cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.

Interpretation: This method determines both NO_3 and NO_2. Contributes to methemoglobinemia. Essential nutrient for photosythetic autotrophs.

Method: SM4500-NO_3^- F Automated Cadmium Reduction Method. The nitrate is reduced to nitrite using cadmium then read as the reddish purple azo dye formed when nitrite is diazotized with sulfanilamine and coupled with N-(1-napthyl)-ethylenediamine dihydrochloride. The intensity of the color is proportional to the level of nitrite plus nitrate in the aliquot.

Detection Limits/Range: 0.02ppm, 0.02ppm to 10.0ppm (can be extended by dilution) Maximum contamination level (MCL) in drinking water is 10ppm.

Cautions or Limitations: Turbidity, iron, copper and other metals, oil and grease and residual chlorine can interfere.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992.

Charge: $16

ECLS-Inorganics

Odor

Synonyms:

Useful For: Determination of threshold odor.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 1000mL

Container: Glass bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper storage.

Interpretation:

Method: EPA 140.1, SM2150 B Threshold Odor Test. The sample is diluted with odor free water until a dilution, that is of the least definitely perceptible odor to each tester, is found. The resulting ratio by which the sample has been diluted is called the Threshold Odor Number (T.O.N.).

Detection Limits/Range: 1 T.O.N.

Cautions or Limitations: Most tap waters and some waste waters are chlorinated. Dechlorination is achieved using an exact stoichiometric quantity of sodium thiosulfate.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992,17th Ed., 1989; EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes,* March 1979.

Charge: $13

ECLS-Inorganics

Oil and Grease

Synonyms:

Useful For: Determination of biological lipids and mineral hydrocarbons in water.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 1000mL

Container: Glass bottles

Collection/Preservation: Adjust pH to 2.0 with 1:1 HCl and cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time, no headspace in bottle.

Method: EPA 413.1, SM5520 B Oil and Grease-Partition-Gravimetric Method. Serial extraction of aqueous sample with fluorocarbon-113 followed by removal of the solvent by distillation, drying of the sample flask, and weighing of the residue.

Detection Limits/Range: 2mg/L, 5mg/L to 1000mg/L

Cautions or Limitations: Materials soluble in the extraction solvent, such as sulfur compounds, some organic dyes, chlorophyll, and some aromatic compounds, are extracted and measured as oil and grease.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992,17th Ed., 1989; EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes,* March 1979.

Charge: $27

ECLS-Organics

Organic Compounds in Potable Water by Solid Phase Extraction

Synonyms: EPA Method 525.1

Useful For: Determination of organohalide pesticides, polynuclear aromatics (PNAs), phthalates and polychlorinated biphenyls (PCBs) in raw and finished water.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Drinking water, raw and finished

Volume/Amount Required: 1000mL

Container: Pesticide clean glass bottle with teflon lined screw cap

Collection/Preservation: Adjust pH of the sample to less than 2 with HCl. If chlorine is present, sodium sulfite should be added. Chill to 4°C.

Storage Instructions: Store at 4°C.

Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount, obvious debris or mud in sample.

Interpretation:

Method: EPA Method 525.1. Target analytes and internal standards are extracted by passing the sample through a C18 bonded Teflon disk. The compounds are then eluted with a small volume of dichloromethane. The volume is reduced and the sample is injected into a GC/MS equipped with a capillary column. The compounds in the sample are identified by comparison of retention times and mass spectra with those obtained from standards run under identical conditions. The concentration is determined by relating the response of the analyte to a series of standards.

Detection Limits/Range: Detection limits range from 0.08ug/L to 3.3ug/L. Contact the laboratory for a complete list of detection limits and compounds.

Cautions or Limitations: Utilization of both retention times and mass spectra provide an extremely high degree of confidence in compound identification.

Reference: EPA Method 525.1, Rev 2.2, May 1991, J.W. Eichelberg, T.D. Beyhmer, W.L. Budde (Rev 1.0, 2.0, 2.1), US EPA, Cincinnati, Ohio.

Charge: $331

ECLS-Organics

Organochlorine Pesticides in Whole Milk

Synonyms:

Useful For: Detection and quantitation of over 25 pesticides such as pp-DDT in whole milk.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Whole Milk

Volume/Amount Required: 250mL

Container: 250mL pesticide clean glass container with pesticide clean teflon lined lid.

Collection/Preservation: Cool to 4°C

Storage Instructions: Store at 4°C

Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample volume.

Interpretation:

Method: A 5 g sample of whole milk is mixed with potassium oxalate and ethanol. Sample is serial extracted with a 1:1 mix of diethyl ether/hexane. Extract components are cleaned and separated with gel permeation chromotagraphy and Florisil column chromatography. Extracts are analyzed using electron capture gas chromatography.

Detection Limits/Range: Detection limits range from 0.4ppb to 10ppb and may vary based on matrix interferences.

Cautions or Limitations: The use of multiple, dis-similar gas chromatographic columns provides a high level of confidence in pesticide identification, however, a small level of uncertainty regarding identification may still exist.

Reference: Journal of the AOAC, Vol.57, No.1, 1974.

Charge:

ECLS-Organics

Organochlorine Pesticides/PCBs in Soil

Synonyms:

Useful For: Detection and quantitation of over 25 pesticides and PCBs in soil, sediments, and sludges.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Soil, sediment, sludge

Volume/Amount Required: 50-100g

Container: Pesticide clean 4 oz glass jar with teflon lined lid.

Collection/Preservation: Chill to 4°C

Storage Instructions: Store at 4°C

Causes for Rejection: Improper storage, improperly cleaned container, insufficient sample amount.

Interpretation:

Method: EPA SW846 3540,3620,8080. A 10g sample of soil is homogenized and mixed with sodium sulfate. The sample is extracted 16 hours using a Soxhlet extraction system with 1:1 acetone/hexane , then concentrated, cleaned and separated. The method provides for elemental sulfur removal. The final extract is analyzed by electron capture gas chromatography.

Detection Limits/Range: Detection limits range from 0.4 to 20ug/kg. Contact the laboratory for a complete list of detection limits and compounds.

Cautions or Limitations: The use of multiple, dis-similar gas chromatographic columns provides a high level of confidence in pesticide identification, however, a small level of uncertainty regarding identification may still exist.

Reference: EPA SW846, 3rd Ed.

Cost: $209

ECLS-Organics

Organochlorine Pesticides/PCBs in Water

Synonyms: EPA Method 608

Useful For: Detection and quantitation of over 25 pesticides and PCBs in non-potable waters and municipal and industrial discharges.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 1000mL

Container: Pesticide clean 1000mL glass bottle with teflon lid.

Collection/Preservation: Fill bottle just to overflowing avoiding any sediment or foreign debris.

Storage Instructions: Store at 4°C

Causes for Rejection: Improper storage, improperly cleaned container, insufficient sample amount.

Interpretation:

Method: EPA Method 608. Sample is extracted with methylene chloride. Sodium sulfate is used to dry the extract which is then concentrated and analyzed using electron capture gas chromatography. Known concentrations of standards are used to identify and quantitate analytes in the sample. The method provides Florisil cleanup and sulfur removal to aid in the elimination and/or separation of compounds.
Detection Limits/Range: Detection limits range from 0.003 to 2.0ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: The use of multiple, dis-similar gas chromatographic columns provides a high level of confidence in pesticide identification, however, a certain small level of uncertainty regarding identification may still exist.
Reference: Federal Register, Part VIII, 40CFR136;EPA 608.
Charge: $190

ECLS-Organics

Organohalide Pesticides/PCBs in Potable Water

Synonyms: EPA Method 505
Useful For: Determination of organohalide pesticides, such as alachlor and heptaclor, and PCBs in raw and finished water.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 1000mL
Container: Pesticide clean glass bottle with teflon lined screw cap
Collection/Preservation: Chill to 4°C
Storage Instructions: Store at 4°C
Causes for Rejection: Improper storage, improperly cleaned container, insufficient sample amount, obvious debris or mud in sample.
Interpretation:
Method: EPA Method 505. A thirty-five (35)mL aliquot of sample is extracted with 2mL of hexane. An aliquot of the extract is injected into a gas chromatograph equipped with electron capture detectors. The sample chromatograms are compared to those of standards to identify and quantify the compounds in the extract.
Detection Limits/Range: Detection limits range from 0.004ug/L to 5.0ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: The use of multiple, dis-similar gas chromatographic columns provides a high level of confidence in pesticide identification, however, a small level of uncertainty regarding identification may still exist. This method is only a screening procedure for PCBs until their presence is confirmed by EPA Method 508A which reports PCBs as decachlorobiphenyl.
Reference: EPA 505 (Rev 2.0) T. Winfield, 1989, US Environmental Protection Agency, Cincinnati, Ohio 45268.
Charge: $190

ECLS-Organics

Pesticides/PCBs in Fish

Synonyms:
Useful For: Detection and quantitation of certain pesticides and PCBs in marine/freshwater fish.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Filleted fish tissue
Volume/Amount Required: 50-100g of filleted fish
Container: Pesticide clean 4 oz glass jar with teflon lined lid or in pesticide free aluminum foil.
Collection/Preservation: Store samples in clean, contaminant-free ice chest until filleted. Keep chilled or frozen.
Storage Instructions: Store frozen
Causes for Rejection: Improper storage, improperly cleaned container, insufficient sample amount.
Interpretation:
Method: A 10 g sample of filleted fish is homogenized and mixed with sodium sulfate. The sample is extracted 6 hours using a Soxhlet extraction system, then concentrated, cleaned and separated. The final extracts are analyzed by electron capture gas chromatography.
Detection Limits/Range: Pesticide compounds: 2.5-10ppb
PCBs :100ppb
(may vary according to matrix interferences)
Cautions or Limitations: The use of multiple, dis-similar gas chromatographic columns provides a high level of confidence in pesticide identification, however, a small level of uncertainty regarding identification may still exist. Metabolized pesticides and PCBs show slightly different chromatographic profiles from those that are unmetabolized, and in these cases, expert judgement is required to determine correct identities.
Reference: EPA600 8-80-38 and numerous correspondences and articles from Journal of the AOAC and Pesticide Monitoring Journal. Contact the laboratory for exact citations.
Charge: $209

ECLS-Organics

PCBs Confirmation

Synonyms: EPA Method 508A
Useful For: Confirming the presence of PCBs in raw source and drinking water.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 2 x 1000mL
Container: Pesticide clean 1000mL glass bottle with teflon lined lid.
Collection/Preservation: Fill bottle to about 90-95% of capactiy.
Storage Instructions: Store at 4°C
Causes for Rejection: Improper storage, improperly cleaned container, insufficient sample amount.
Interpretation:
Method: EPA Method 508A. Sample is serially extracted with methylene chloride. Extract is dried, concentrated and transferred to chloroform solvent. The PCBs are converted to decachlorobiphenyl (DCB) which is extracted from the chloroform with hexane. The purified extract is analyzed using electron capture gas chromatography.
Detection Limits/Range: 0.5ug/L to 5.0ug/L
Cautions or Limitations: Other non-PCB compounds may be converted to DCB giving false postitives or positively biased data. This method gives total PCB using the DCB value, therefore data about individual parent PCBs is lost.
Reference: EPA600/4-88/039, *Methods for Determination of Organic Compounds in Drinking Water*, EPA Method 508A.
Charge: $190

ECLS-Inorganics

Petroleum Hydrocarbons, Total Recoverable

Synonyms:

Useful For: Determination of fluorocarbon-113 extractable petroleum hydrocarbons including light fuels.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 1000mL

Container: Glass bottles

Collection/Preservation: Adjust pH to less than 2 with H_2SO_4 or HCl and cool to 4°C.

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 7 day holding time.

Method: EPA 418.1 Extraction and Infrared Spectroscopy. The sample is serially extracted with fluorocarbon-113 and water removed by passing through silica gel. Infrared spectroscopy is performed on the extract and the result compared to a standard line.

Detection Limits/Range: 1mg/L

Cautions or Limitations: Fatty acids are removed from the extract by passing through silica gel.

Reference: EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes*, March 1979.

Charge: $17

ECLS-Inorganics

pH

Synonyms: Hydrogen Ion Concentration, pH Value

Useful For: Water supply, water treatment and wastewater treatment.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 25mL (250mL recommended)

Container: Plastic or glass bottles

Collection/Preservation: None

Storage Instructions: 4°C

Causes for Rejection: Improper container or storage, improper labeling.

Method: SM4500 H (Electrochemical)

Detection Limits/Range: 0 to 14 pH units.

Cautions or Limitations: Soaps, oils, suspended solids or precipitates may coat the glass electrode and cause inaccurate results.

Reference: *Standard Methods for the Examination of Water and Wastewater*, 17th Ed, 1989 and 18th Ed, 1992.

Charge: $10

ECLS-Inorganics

Phenols

Synonyms:

Useful For: Determination of phenols in water which can cause odorous and objectionable tasting chlorophenols under chlorination procedures.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 500mL

Container: Glass bottles

Collection/Preservation: Adjust pH to less than 2 with conc. H_2SO_4 and cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.

Method: EPA 420.1, SM5530-Phenols A, B Cleanup Procedure , C Chloroform Extraction Method, D Direct Photometric Method. An aliquot of the sample is distilled and reacted with potassium ferricyanide to form a colored antipyrine dye. For potable waters, the dye is extracted from the aqueous aliquot with chloroform and read to reduce detection limits. For non-potable waters, the dye is read directly in the aliquot.

Detection Limits/Range: Potable DL 0.005mg/L, other waters DL 0.05mg/L

Cautions or Limitations: Phenol decomposing bacteria, oxidizing and reducing substances, and alkaline pH values are dealt with by acidification.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, EPA-600 4-79-020 *Methods for Chemical Analysis of Water and Wastes*, March 1979.

Charge: $27

ECLS-Inorganics

Phosphorus, Ortho

Synonyms: O- PO_4^{3-} as P

Useful For: Determination of discharge of sewage into surface waters, runoff of fertilizers from agricultural use, and total organic phosphate.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 10mL (100mL recommended)

Container: Glass bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 48 hour holding time.

Method: SM4500-P B Sample Preparation, F Automated Ascorbic Acid Reduction Method. After an aliquot is suitably prepared, ammonium molybdate and potassium antimonyl tartrate are added which forms a complex with orthophosphate. This complex forms an intense blue color when reduced with ascorbic acid. The intensity of this color is then read and compared to a set of standards.

Detection Limits/Range: 0.02ppm, 0.02ppm to 1.0ppm (can be extended by dilution)

Cautions or Limitations: High silica levels may cause interferences.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992,17th Ed, 1989.

Charge: $19

ECLS-Organics

Purgeable Organics in Drinking Water

Synonyms: EPA Method 524.2

Useful For: Detection and quantitation of over 60 volatile compounds such as chloroform, benzene and hexachlorobutadiene in potable water.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Drinking water, raw and finished

Volume/Amount Required: 3 x 40mL (extra vial recommended)

Container: Glass vial with screw cap and Teflon lined septum

Collection/Preservation: Adjust pH to less than 2 with HCl. Fill vial to overflowing and cap avoiding air bubbles. Chill to 4°C
Storage Instructions: Store at 4°C
Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount, air bubbles in vials.
Interpretation:
Method: EPA Method 524.2. Volatile organic compounds are purged from the sample with an inert gas and trapped on an adsorbent. The adsorbent is heated and the components are desorbed into a GC/MS. The compounds in the sample are identified by comparison of retention times and mass spectra with those obtained from standards run under identical conditions. The concentration is determined by relating the response of the analyte to a series of standards.
Detection Limits/Range: Detection limits range from 0.12ug/L to 0.81ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: Utilization of both retention times and mass spectra provides an extremely high degree of confidence in compound identification.

Reference: EPA Method 524.2, Rev 3.0, May 1989, J.W. Eichelberg, W.L. Budde, US EPA, Cincinnati, Ohio.
Charge: $250

ECLS-Organics
Purgeable Organics in Nonpotable Water
Synonyms: EPA Method 624
Useful For: Detection and quantitation of over 30 volatile compounds in nonpotable waters and municipal and industrial discharges.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous (nonpotable)
Volume/Amount Required: 5 x 40mL (extra vial recommended)
Container: Glass vial with screw cap and Teflon lined septum
Collection/Preservation: If the sample contains residual chloride, notify the laboratory which will add 10mg of sodium thiosulfate to each vial prior to release for use in the field. Adjust pH to less than 2 with 1:1 HCl. Fill vial to overflowing and cap avoiding air bubbles. Chill to 4°C
Storage Instructions: Store at 4°C
Causes for Rejection: Improper preservation or storage, improperly cleaned container, insufficient sample amount, air bubbles in vials.
Interpretation:
Method: EPA Method 624.2. Volatile organic compounds are purged from the sample with an inert gas and trapped on an adsorbent. The adsorbent is heated and the components are desorbed into a GC/MS. The compounds in the sample are identified by comparison of retention times and mass spectra with those obtained from standards run under identical conditions. The concentration is determined by relating the response of the analyte to a series of standards.
Detection Limits/Range: Detection limits range from 0.65ug/L to 3.31ug/L. Contact the laboratory for a complete list of detection limits and compounds.
Cautions or Limitations: Utilization of both retention times and mass spectra provides an extremely high degree of confidence in compound identification.
Reference: Federal Register, Part VII, 40CFR136, EPA Method 624 , US EPA, Cincinnati, Ohio.
Charge: $250

ECLS-Inorganics
Residue, Filterable
Synonyms: Suspended Solids (SS)
Useful For: Determination of solids for compliance with regulatory wastewater effluent limitations and for controlling biological and physical wastewater treatment processes.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL
Container: Glass or plastic bottles
Collection/Preservation: Cool to 4°C
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 7 day holding time.
Interpretation:
Method: EPA 160.2, SM2540 D Total Suspended Solids Dried at 103-105°C. Sample is filtered through a preweighed glass fiber filter and the residue and filter are dried to a constant weight.
Detection Limits/Range: 1mg/L
Cautions or Limitations: Saline waters and some wastewaters may be subject to a positive interference.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992,17th Ed., 1989; EPA600 4-79-020 *Methods for Chemical Analysis of water and Wastes,* March 1979.
Charge: $17

ECLS-Inorganics
Residue, Non-Filterable
Synonyms: Total Dissolved Solids (TDS)
Useful For: Determination of solids for compliance with regulatory wastewater effluent limitations and for controlling biological and physical wastewater treatment processes.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL
Container: Glass or plastic bottles
Collection/Preservation: Cool to 4°C
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 7 day holding time.
Interpretation:
Method: EPA 160.1, SM2540 C Total Dissolved Solids Dried at 103-105°C. The sample is filtered and the filtrate (portion that passes through the filter) is transferred to a preweighed dish and evaporated to a constant weight.
Detection Limits/Range: 2mg/L
Cautions or Limitations: Highly mineralized water with a significant concentration of calcium, magnesium, chloride, and/or sulfate may be hygroscopic and require prolonged drying.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed., 1989, EPA600 4-79-020 *Methods for Chemical Analysis of Water and Wastes*, March 1979.
Charge: $10

ECLS-Inorganics

Residue, Total

Synonyms: Total Solids (TS)

Useful For: Determination of solids for compliance with regulatory wastewater effluent limitations and for controlling biological and physical wastewater treatment processes.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 100mL

Container: Glass or plastic bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 7 day holding time.

Interpretation:

Method: EPA 160.3, SM2540 B Total Solids Dried at 103-105°C. The sample is transferred to a preweighed dish and evaporated to a constant weight.

Detection Limits/Range: 2mg/L (can be extended by decreasing amount of sample)

Cautions or Limitations: Highly mineralized water with a significant concentration of calcium, magnesium, chloride, and/or sulfate may be hygroscopic and require prolonged drying.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed., 1989, EPA600 4-79-020 *Methods for Chemical Analysis of Water and Wastes*, March 1979.

Charge: $17

ECLS-Inorganics

Settleable Matter

Synonyms:

Useful For:

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 1000mL

Container: Glass or plastic bottles

Collection/Preservation: None

Storage Instructions: 4°C

Causes for Rejection: Improper container, paperwork, storage, labeling, exceeding holding time.

Interpretation:

Method: SM2540 F Settleable solids (Volumetric Method). 1 liter of sample is placed in an Imhoff Cone and allowed to settle for 45 min. The sides of the cone are then gently agitated and the sample allowed to settle for another 15 min then read.

Detection Limits:

Cautions or Limitations: Floating material will not be measured

Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed, 1989 and 18th Ed, 1992.

Charge: $10

ECLS-Inorganics

Specific Conductance

Synonyms: Conductivity

Useful For: Determination of the degree of mineralization of waters

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 250mL

Container: Glass or plastic bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.

Interpretation:

Method: EPA 120.1, SM2510 A,B Conductivity. The conductance of an aliquot of the sample is read using a standardized conductivity cell.

Detection Limits/Range: DL 0.1umho/cm (umho/cm=1/uohm-cm), range for freshly distilled water 0.5umho/cm to 2.0umhos/cm, range for drinking water throughout the US 50umho/cm to 1500umho/cm.

Cautions or Limitations:

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989, EPA-600 4-79-020 *Methods for Chemical Analysis of Water and Wastes*, March 1979.

Charge: $12

ECLS-Inorganics

Sulfate

Synonyms: SO_4^{-2}

Useful For: Determination of all concentration ranges of sulfate including those occurring due to joint source pollution.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 500mL

Container: Glass or plastic bottles

Collection/Preservation: Cool to 4°C

Storage Instructions: 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.

Method: EPA 375.4, SM4500-SO_4^{2-} E Turbidimetric Method. Sulfate ion is precipitated with barium chloride in an acetic acid medium to form barium sulfate. The light absorbance of the suspension is read on a spectrometer near 420nm and compared to a set of standards.

Detection Limits/Range: 1ppm, to 40ppm (can be extended by dilution)

Cautions or Limitations: Silica levels over 500ppm and suspended matter and color may cause interferences.

Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed., 1989.

Charge: $24

ECLS-Inorganics

Sulfide

Synonyms: H_2S, S^{-2}

Useful For: Measurement of total and dissolved sulfides in drinking, surface and saline water, and domestic and industrial wastes.

Request Form: CHEM-44, DWR-018(PW2)

Specimen/Sample Type: Aqueous

Volume/Amount Required: 250mL (500mL recommended)

Container: Plastic or glass bottles

Collection/Preservation: Preserve sample with four (4) drops of 2N zinc acetate per 100mL of sample.

Storage Instructions: Store at 4°C

Causes for Rejection: Improper preservation or storage, sample exceeds 7 day holding time.
Method: SM4500 S^{2-} E Iodometric Method. An aliquot of the sample is reacted with an excess of standard iodine solution then backtitrated with a standard sodium thiosulfate solution until the blue color of the starch indicator disappears.
Detection Limits/Range: 1.0ppm
Cautions or Limitations: Reduced sulfur compounds (sulfite, thiosulfate, and hydrosulfite) interfere. Sample must be collected with minimum aeration.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989, 18th Ed. 1992.
Charge: $20

ECLS-Inorganics

Total Organic Carbon, Aqueous

Synonyms: TOC
Useful For: Determining the level of organically bound carbon.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL (250mL recommended)

Container: Amber bottles with Teflon-lined caps
Collection/Preservation: Preserve sample with conc. H_2SO_4 to a pH of 2 or less. Do not add an excessive amount of H_2SO_4.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM5310A&C Persulfate-Ultraviolet Oxidation Method. The organic carbon in the sample is oxidized to CO_2 in reaction chamber by persulfate in the presence of ultraviolet light. The CO_2 is carried in a gas stream to a nondispersive infrared analyzer and read. The reading is compared to a set of standards.
Detection Limits/Range: 1.0ppm to 2500ppm
Cautions or Limitations: Excessive acidification of samples, highly turbid samples, large organic particles or very large or complex organic molecules, high concentration of chloride all interfere with this analysis.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989; *Standard Methods for the Examination of Water and Wastewater,* 18th Ed.,1992.
Charge: $26

ECLS-Inorganics

Total Organic Carbon, Non-aqueous

Synonyms: TOC
Useful For: Determining the level of organically bound carbon in non-aqueous samples.
Request Form: CHEM-44
Specimen/Sample Type: Soil
Volume/Amount Required: 1g (100g recommended)
Container: Glass jars with TFE-lined caps
Collection/Preservation: Chill to 4°C.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM5310A&B Combustion-Infrared Method. The organic carbon is converted to CO_2 in a heated reaction chamber with an oxidative catalyst. The CO_2 is carried by a gas stream to a non-dispersive infrared analyzer and read. The reading is compared to a set of standards.
Detection Limits/Range: 2000ppm to 10000ppm
Cautions or Limitations: See Total Organic, Carbon, Aqueous
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989; *Standard Methods for the Examination of Water and Wastewater,* 18th Ed.,1992.
Charge: $29

ECLS-Inorganics

Total Organic Halides

Synonyms: TOX, Total Organic Halogens
Useful For: Determining the quantity of organic halogen compounds.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 350mL (1000mL recommended)
Container: Amber glass bottles with TFE-lined caps
Collection/Preservation: Preserve sample with conc. HNO_3 to a pH of 2 or less. Do not add an excessive amount of HNO_3. Add 5mg of sodium sulfite crystals per liter of samples to reduce residual chloride. No air space should be left in the bottle.
Storage Instructions: Store at 4°C.
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM5320 A,B Adsorption-Pyrolysis-Titrimetric Method. The organic halides are adsobed onto activated carbon. Inorganic halides are removed from the carbon by competitive displacement by nitrate ions. The carbon is placed into a furnace that pyrolizes the carbon to carbon dioxide and the halides to hydrogen halide. The hydrogen halide is measure in a microcoulometric titration cell and the response compared to a set of standards.
Detection Limits/Range: 0.040ppm to 10ppm
Cautions or Limitations: Particulate matter, excessive amounts of chloride, chlorite, chlorate, bromide, iodide, certain alcohols, and acids that are halogenated may interfere.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 17th Ed., 1989, 18th Ed., 1992.
Charge: $87

ECLS-Inorganics

Phosphorus, Total

Synonyms: PO_4^{3-} as P
Useful For: Determination of discharge of sewage into surface waters, runoff of fertilizers from agricultural use, and total organic phosphate.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 60mL (250mL recommended)
Container: Glass bottles
Collection/Preservation: Adjust pH to 2.0 with H_2SO_4 and cool to 4°C
Storage Instructions: 4°C
Causes for Rejection: Improper preservation or storage, sample exceeds 28 day holding time.
Method: SM4500-P B Sample Preparation, F Automated Ascorbic Acid Reduction Method. After suitable sample preparation, the aliquot is reacted with ammonium molybdate and potassium antimonyl tartrate to form a complex with phosphate. When reduced with ascorbic acid, this complex produces an intense blue color which is read and compared to a set of standards.

Detection Limits/Range: 0.02ppm, 0.02ppm to 1.0ppm (can be extended by dilution)
Cautions or Limitations: High silica levels may cause interferences.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed. 1989.
Charge: $24

ECLS-Inorganics

Turbidity

Synonyms:
Useful For: Determination of clarity of water for human consumption.
Request Form: CHEM-44, DWR-018(PW2)
Specimen/Sample Type: Aqueous
Volume/Amount Required: 100mL
Container: Glass or plastic bottles
Collection/Preservation: Cool to 4^{o}C
Storage Instructions: 4^{o}C
Causes for Rejection: Improper storage, sample exceeds 48 hour holding time.
Method: EPA 180.1, SM2130 B Nephelometric Method. An aliquot of the sample is placed in the nephelometer and compared to a set of standards. The intensity of the light scattering is proportional to the turbidity of the sample.
Detection Limits/Range: 0.05 Nephelometric Turbidity Units (NTU), 0.05NTU to 40NTU (can be extended by dilution)
Cautions or Limitations: Dirty glassware may cause interferences.
Reference: *Standard Methods for the Examination of Water and Wastewater,* 18th Ed., 1992, 17th Ed, 1989.
Charge: $14